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# Informal Employment in Kazakhstan: A Blessing in Disguise?

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Abstract: Informality is heterogeneous, dynamic and difficult to quantify; the formal-informal gap in earnings is one major component of it that we wish to examine. Using the 2013 Kazakhstan Labour Force Survey (KLFS), we analyse the returns that formal and informal workers receive for a given set of characteristics and also use a matching technique to decompose the gap. We observe that in Kazakhstan there is a substantial earnings gap in favour of formal workers and that a quarter of the gap remains unexplained. Our study also highlights the importance of matching-based decomposition and distributional analysis in explaining the differences in earnings between formal and informal workers.

Keywords: Formal and Informal Sectors; Labor Policy; Post Transition Economies.

JEL: J46; P52.

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## 1. Introduction

Since the early 1990s, despite substantial growth in the global economy, informality rates have remained unchanged or even rising in many countries (Kanbur, 2014). As such, informality is 'increasingly becoming normal' worldwide and certain groups, such as young men and women, are more likely to be in informal jobs (Jutting and de Laiglesia, 2009: 18). According to the World Bank (2013), informality erodes social cohesion, lowers productivity and nurtures poverty. Moreover, informal workers lack the legal rights of contractually-employed individuals, and often are denied access to capital and technology.

High levels of informality are observable in the transition economies of the former Soviet Union, albeit with considerable variations between countries, as shown in Schneider et al. (2010). On the other hand, given that there are several conceptualisations of informality, the results of any study will depend on what measure of informality the researchers use and there is no real consensus among researchers around the measurement of informality (Elgin and Erturk, 2018). Lehmann (2015) suggests employing measures of informality that are based on the social protection criteria when estimating the incidence of informal employment in transition countries. It is also worth noting that evidence on the formal-informal wage gap is limited for transition countries and, moreover, may be biased due to selection problems (Lehmann, 2015).

This paper seeks to understand whether workers enjoy higher rates of return to particular characteristics in the informal sector, explain the difference in wages between the formal and informal workers, and also discuss, albeit highly tentatively, the implications of informality on productivity. We explore these questions by conducting Heckman's two-step regression analysis of earnings equations, and then use Nopo (2008) matching-based decomposition method to decompose the formal-informal wage gap. The latter technique does not require the estimation of earnings regressions, and hence avoids potential selection biases, and by comparison with the traditional (Oaxaca-Blinder) approach this method of estimation deals with the cases for which there are severe gaps in the common support assumption for observable characteristics (Fortin et al. 2010). Following Lehmann (2015), we use the "legalistic" definition of informality that considers working without social security coverage as informal employment.

We present several key findings. First, there are jobs in the formal sector without the benefits of social protection. Second, we find that informality rates are generally highest among

women and young people. Third, the relatively high proportion of workers with a formal contract who lack employment-linked social benefits suggests the weak enforcement capacity of public institutions. In addition, given institutional influences, we argue that informality can be a necessary and practical means through which individuals avoid regulation. It is also important to note that if informal workers' characteristics become the same as that of formal workers' characteristics over the common support, nearly 50 per cent of the wage differential between the two groups would disappear. In addition to the findings mentioned above, we argue that institutional arrangements discourage the use of formal work contracts and renders informal employment mechanisms relatively more attractive for employers.

This article is structured as follows. Section 2 features a literature review on the informal economy, particularly in the context of transition economies. This section also includes an overview of the informal economy in Kazakhstan. A description of the data is in the third section, and a discussion of econometric methodology follows in the fourth section. Analysis of the empirical results is discussed in the fifth section. Section 6 concludes.

**2. Literature Review**

The International Labour Organization's (ILO) considers a worker informal if he/she is not subject to national labour legislation, income tax, social protection or social benefits such as advance notice of dismissal, severance pay, or paid annual or sick leave (Hussmanns, 2001). The defining characteristic of informal work is that it is free-entry, since there are no formal restrictions to entering and exiting the informal sector (Fields, 1990: 55). The informal sector also offers nonpecuniary benefits (e.g. autonomy) and higher earnings potential in 'upper-tier' jobs than a comparable position in the formal sector (Fields, 1990).

However, there are workers who would prefer formal jobs, but this is because their likely alternatives are low-paid ('lower-tier') jobs in the informal sector. If workers in the uncovered (informal) sector are excluded by the wage rigidity in the covered (formal) sector of the economy above market-clearing wages, then this will result in excess supply of labour in the covered sector that forces workers to 'queue for preferred formal jobs whilst subsisting in the informal microfirm sector' (Perry et al., 2007: 44). In this case, wage rigidity effectively excludes workers, pushing them towards informality. When a worker is successful in the informal space,

this only reinforces his/her tendency to continue to work informally, abandoning even nascent notions to rejoin the formal economy.

Maloney's free-choice theory of employment stipulates that in a dual labour market, certain individuals, depending on their characteristics, obtain an income premium in the informal economy and accordingly, self-select into informal employment. For Maloney, wages, while important, are not the decisive factor for employment decisions in a segmented labour market. Low wages are offset by other factors, such as flexible work hours, a sense of community, the ability to be one's own boss, that augment individual welfare. Even if employment in the informal sector offers an inferior wage, its 'package of benefits' renders the informal sector equally attractive, if not more attractive, than the formal sector (Maloney, 2003: 72). Workers may also remain informal due to barriers to mobility, and workers may opt to remain informally employed because formal employment does not offer healthcare or overtime benefits. Like Fields, Maloney also concludes that informal workers fall into a 'poverty trap' of indecent work and it becomes insurmountable difficult for them to transition to formal employment, especially as other sectors of the economy develop (Maloney, 2003: 72).

### 2.1. Informality in transition economies

The classical labour segmentation theory presupposes that there is a sound, macroeconomic environment for enterprise development, including the rule of law, governance, a sound banking system and macroeconomic stability. However, in transition economies, the absence of such institutional prerequisites allows for informal activity to proliferate. Schneider et al. (2010) suggest that the structure of the official economy, the quality of governance and institutional capacity, the tax system, and labour market regulations constitute the leading factors influencing informal employment. They concluded that in most countries it is the regulatory burden and administrative red tape in the areas of taxation and standards regulation, rather than wages, that most strongly impact the growth of the informal sector. Johnson et al. (1997: 160) argued that entrepreneurial activity contracts in an environment where regulation, taxation or corruption corrodes profitability. And when the government fails to provide an attractive combination of tax rates, regulations and public goods, leaving these services to be fulfilled in the private or unofficial sector, entrepreneurs either operate underground or with a pseudo-formal status.

Nearly 18 years since the *de-facto* end of the transition period, the informal economy has become a structural feature of many transition regimes in Eastern Europe and Central Asia. Gimpelson and Zudina (2012), using productivity-based definition of informality, find that 20–25 per cent of employment in Russia consists of informal jobs. Like Johnson et al. (1997), the authors argue that the low quality of institutions directly contributed to the growth in informal employment. Gimpelson and Slonimczyk (2013) show that informal activity hovers around 50 per cent of economic activity in Russia, and that weak labour market institutions (low minimum wages, low-pay public sector work, weak trade unions and inadequate enforcement of regulation) explain the movement of labour from formal to informal employment. More recently, Gimpelson and Kapelyushnikov (2014: 17–22) highlight an important point: the quality of institutions is a critical factor which affects the informal economy and explains the rise in informality in Russia in the 2000s. Some recent evidence from transition countries finds labour market segmentation for dependent employees within informal employment: there are no barriers in the lower tier of informal employment but large wage penalties exist and that informal workers earn more than the formally employed in the upper rationed tier (Lehmann and Zaiceva, 2015). Staneva and Arabsheibani (2014) report that around 65 per cent of Tajik workers are informally employed, and that they tend to be less qualified. Their analysis make an interesting comparative case, since formal sector workers in Tajikistan face a wage penalty across the entire earnings distribution. Using Nopo's decomposition method, the authors find that formal workers earn 43 per cent less than a typical informal worker and that 32 per cent of the observed earnings differential is attributable to the unexplained component of the wage gap.

**2.2. The informal economy in Kazakhstan**

The surge in informal economic activity in Kazakhstan in the 1990s was a consequence of the dissolution of Soviet central planning (Blanchard and Kremmer, 1997: 7). And by 2000, when most enterprise privatisation reforms were concluded, and global oil prices began their decade-long appreciation, it was expected that Kazakhstan's economy would recover, propping up income levels and reducing the size of the informal sector as workers transition to more formal positions. However, the opposite had occurred, with the informal economy expanding in tandem with GDP growth. Between 2005–12, the non-observed (shadow and informal) economy generated over 19 per cent of GDP (Kozhakhmetov, 2014). Furthermore, at times of

macroeconomic shocks women tend to look for low paid jobs in the services sector in urban areas and that these jobs are unlikely to provide social benefits (An et al., 2016).

According to a study on informality conducted by Kazakhstan Agency on Statistics (KAS) in 2014 approximately 2.9 million of the 8.5 million-member workforce are informal workers and an estimated 77 per cent of informal workers are paid employees in a registered enterprise. Using the 2009 KLFS, Rutkowski (2011) reports that some 33 per cent of Kazakhstan's total workforce is informal and that '53% of informal workers in Kazakhstan are wage employees in both formal and informal firms' (Rutkowski, 2011: 1). Moreover, informal workers in Kazakhstan face a 13 per cent earnings penalty on average when compared to their formal counterparts (Rutkowski, 2011: 7). Mussurov and Arabsheibani (2015), using the KLFS data for the period between 2006-2011, show that informality rates among the self-employed fell by 7% between 2006 and 2011.

We can observe from Table 1 that aspects of informality, based on contract type, are particularly prominent among agricultural workers, young people, and women, echoing Rutkowski's findings. The share of women in paid employment was slightly higher than the share of men (70.2 per cent versus 68.7 per cent), and that the majority (82 per cent) of urban workers were engaged in paid work. We also tabulate the share of workers under written labour contract who do not receive mandatory social benefits (paid vacation, paid sick leave, and employer contributions to the national pension fund). Workers who answered these questions with a definitive "yes" were counted as formal, whereas those who put "no", "maybe" or "I don't know" were classified as informal. Examination of gender differences in relation to contract arrangements and social benefits shows a similar pattern. There is also a striking difference between urban and rural workers with regard to contract arrangements and absence of social benefits. While 88 per cent of rural workers are working with written labour contracts, 87 per cent of rural workers confirm employer pension contributions, 80 per cent are entitled to vacation, and 78 per cent receive paid sick leave. These estimates show that even workers who hold a written contract report that they can be denied social benefits and therefore satisfy the ILO's definition of informal employment.

***Table 1. Employment, Contracts and Social Security by Gender and Locale, 2013***

The evidence presented in Figure 1 shows that younger workers are more likely to be working with "verbal" or civil law employment contracts than older workers; some 10 per cent of young people were employed under these two types of informal contract arrangements, compared to 6.5 per cent of workers over age 45. The share of civil contracts among young workers (4.3 per cent) is twice as high than among older workers (2 per cent). Thus, the age of a worker has a very strong influence on their contract type, as older workers' benefit from tenure and experience.

***Fig. 1. Contract arrangements by age cohort, 2013***

Figure 2 shows that a degree-holding employee is more likely to report having a written labour contract. Among workers with a secondary education or less, around 13 per cent reported oral employment arrangements. Workers who have completed secondary general education (or below) are more likely to be employed on a civil law contract than workers who have a higher education. In general, informal contracts are more prevalent among the low-educated workers.

***Fig. 2. Contract arrangements by education, 2013***

As might have been expected, Figure 3 illustrates that written labour contracts are less likely to be observed in lower skilled employment. Some 18 per cent of workers within service and trade occupations reported informal work arrangements. Civil employment contracts are most prevalent among skilled agricultural workers. Employers can, and often do, renew civil contracts every 12 months in order to avoid the financial overhead of a full-time employee. This is because a civil contract turns into a permanent (i.e. formal) labour contract if not terminated after 12 months or renewed as a civil contract.

***Fig. 3. Contract arrangements by occupation, 2013***

The subsequent sections explore the informal economy in Kazakhstan in greater detail. We empirically examine the relationship between individual characteristics and earnings for 'comparable' positions in formal and informal employment. By decomposing the wage gap, we are able to examine the role that endowments and discrimination play in explaining underlying differences in earnings between the two sectors.

## 3. Data Description

This study uses first quarter data from the KLFS administered in 2013. The KLFS collected data from 21,000 households throughout the country since 2001, but the question on

household income first appeared in the survey in 2013. We focus on the main job and thus answers to a primary source of employment (*osnovnnaya rabota*) are included, while workers' responses involved in a secondary form of work (*dopolnitel'naya rabota*) are excluded. Individuals in paid employment who worked in the agricultural sector were included in regressions.

In the survey, respondents are asked to report total individual earnings, identify sources of income and also identify one of thirteen income brackets. Thus, we keep only those employees who report the wage and since income is banded, we assigned the mid-points of the earnings bands; and for the unbounded top interval, starting at 500,000 KZT ($2,645), income data from the 2013 Kazakhstan Household Budget Survey is used to impute the mid-point level of earnings. Explanatory variables include five education dummies: *'secondary'* (school certificate), '*lower vocational'* (basic professional), '*higher vocational'* (secondary professional), '*incomplete university'* and '*university degree'*. All individuals in the sample were categorised according to the National Classification of Occupations, which uses four skill levels to define the broad structure of the classification. A dummy variable for managerial occupation (*'manager'*) serves as a proxy for entrepreneurial ability and includes the following major sub-groups: legislators and senior officials, corporate managers and general managers. Our estimations account for tenure, level of education, region and business size, with microfirms ('*micro*') containing fewer than eleven employees, and years of potential post-school labour market experience ('*exp*'), defined as age minus years of schooling minus 7.

Those working in paid employment report three types of contractual arrangement: a labour contract (*trudovoi dogovor*), a civil law contract (*grajdansko-pravovoi dogovor*) and an oral (*ustnyi dogovor*) employment agreement. The first two types are written contracts. Assuming there are no market failures or distortions, those working with a labour contract should receive all three employment benefits as stipulated in the Labour Code (social security contributions, paid vacation time and sick leave). Workers working with labour contract who do not receive one or all forms of benefits are considered as informal workers. Whereas a labour contract offers permanent employment and a salary, a civil contract stipulates a specific deliverable and/or a time-period for employment. While a legally binding document, a civil contract does not require the employer to extend social protections to the contracted worker.

Therefore, we follow Gimpelson and Kapeliushnikov (2013) methodology, and consider those who possess a civil contract as informal workers. Finally, the informally employed group also includes those working with "verbal" employment contract.

The restricted sample includes individuals between the age of 18-58 for women and 18-63 for men. Our final sample consists of 17092 formal and 3558 informal workers, whose only source of income were wages.

**4. Econometric Methodology**

The key modeling decision is based on the rational choice argument; that is, the selection decision can be seen as the outcome of utility maximisation based on expected rewards in which the utility stream from the formal employment status exceeds that of informal status. Omitting individual subscripts for ease of notation, earnings in the two sectors are determined by:

$$Y_1 = X\beta_1 + u_1 \quad (1)$$

$$Y_2 = X\beta_2 + u_2 \quad (2)$$

where $Y_1$ and $Y_2$ are the individual wages in the formal and informal sectors, $X$ is a vector of observed characteristics which includes an expanded set of explanatory variables and $\beta$ is the corresponding vector of coefficients to be estimated.

Since the probability of the selection is not independent of the expected or perceived rewards in those sectors a Heckman-type model is applied. Specifically, it is assumed that selection is determined by the following index function:

$$S^* = \delta(\ln Y_1 - \ln Y_2) + X\gamma + \upsilon \quad (3)$$

where $S^*$ is a latent variable indicating the endogenous selection process which determines the sector choice. $X$ is the vector of the observed characteristics.

The observed realisation of the index equation:

$S = 1$ if $S^* > 0$ (formal) (4)

$S = 0$ if $S^* = 0$ (informal) (5)

It is only possible to observe respondents only in one state. That is, data reported by an individual regarding their primary employment (*osnovnaya rabota*) is included. Thus, $Y_1$ is observed only when $S=1$ and, therefore, $Y_2$ is latent. Estimation of expected earnings for a formal (an informal) worker who self-selected into the formal (informal) employment involves estimation of the selection equation using a Probit model. To correct for selection bias two additional terms – the inverse Mills ratios – are added to the earnings equations.

The two earnings equations are written as follows:

$$E(Y_1 \mid S=1) = \mathrm{E}(\mathrm{Y}_1 \mid S^* > 0) = \mathrm{E}(\mathrm{Y}_1 \mid \mathrm{X}\gamma + \upsilon > 0) = \mathrm{E}(\mathrm{Y}_1 \mid \upsilon > -\mathrm{X}\gamma) = \alpha_1 + X\beta + \mathrm{E}(\mathrm{u}_1 \mid \upsilon < \mathrm{X}\gamma)$$
$$= \alpha_1 + X\beta + \sigma_{1\upsilon}\left[\frac{\phi(X\gamma)}{\Phi(X\gamma)}\right] \tag{6}$$

$$E(Y_1 \mid S=0) = \mathrm{E}(\mathrm{Y}_0 \mid S^* < 0) = \mathrm{E}(\mathrm{Y}_0 \mid \mathrm{X}\gamma + \upsilon < 0) = \mathrm{E}(\mathrm{Y}_0 \mid \upsilon < -\mathrm{X}\gamma) = \alpha_0 + X\beta + \mathrm{E}(\mathrm{u}_0 \mid \upsilon > \mathrm{X}\gamma)$$
$$= \alpha_0 + X\beta + \sigma_{0\upsilon}\left[\frac{\phi(X\gamma)}{1-\Phi(X\gamma)}\right] \tag{7}$$

The specification of the earnings equation used is a model with a basic set of regressors which includes conventional human capital, personal characteristics, variables that capture local labour market conditions (regions and rural), entrepreneurial and managerial talent ('*manager'*), job tenure, industry and firm size ('*micro'*). The share ('*informality ratio'*) of informal workers in the household is used to meet the exclusion restriction in the first stage Probit.

We also use Nopo's (2008) non-parametric matching-based method to estimate the explained and unexplained components of the wage gap based on formal and informal workers who have common characteristics (supports). This methodology relies on the exact matching algorithm to compute the missing counterfactual earnings distribution which would be observed for informal workers if their individual characteristics were similar to that of formal workers. Note that if there is insufficient overlap in the distribution of potential confounders across the two labour market groups, the overlapping support assumption for explanatory variables is violated (Fortin et al., 2010: 16–19). In other words, there may be a mismatch in characteristics between formal and informal workers and Nopo's non-parametric matching technique allows us to address cases where there are severe gaps in the intersection of the observable characteristics between the two groups through the exact matching procedure which computes the

counterfactual earnings distribution only for the workers with common characteristics and therefore taking into account the differences in them. The common support constraint allows us to obtain a sample of matched informal and formal workers with the same distribution of observable individual characteristics (but not necessarily the same distribution of earnings) and also a sample of unmatched informal workers and another of unmatched formal workers.

Specifically, the raw gap between formal (*F*) and informal (*I*) conditional earnings can be decomposed onto four additive components as follows:

$$\Delta = E[Y \mid F] - E[Y \mid I] = \Delta_O + \Delta_F + \Delta_I + \Delta_X \quad (8)$$

The component $\Delta_F$ ($\Delta_I$) measures the part of the gap that can be explained by differences between formal (informal) workers in the common support and formal (informal) workers out of the common support. These two components measure the difference between matched and unmatched workers, since the counterfactual earnings distribution for each informal worker is estimated as the weighted average wages of the matched formal workers. The component $\Delta_O$ measures the unexplained part that can be explained by differences in returns to characteristics and the component $\Delta_X$ captures part of the gap that can be explained by differences in the distribution of observable characteristics that are found among both formal and informal workers. These two components correspond to the composition ($\Delta_X$) and the wage structure ($\Delta_O$) effects in the conventional Oaxaca-Blinder (Oaxaca 1973) decomposition methodology. The advantage of Nopo's method procedure is that we can simultaneously estimate the common support and the mean counterfactual wage for informal workers on the common support. In addition, this method allows us to estimate the distribution of the unexplained wage gap over the entire earnings distribution. On the other hand, the inclusion of many covariates for matching will reduce the likelihood of finding an exact match (Djurdjevic and Radyakin, 2005).

**5. Empirical Results**

Table 2 reports the descriptive statistics for the variables used in the estimations and a pairwise comparison of the means. We find that mean hourly wages are 336 tenge ($2.24) in the formal sector and 244 tenge ($1.63) in the informal sector. That is, formal workers earn, on average, approximately 38 per cent (or $0.61) more than their informal counterparts. The size of

the gap is similar to the levels found in Argentina, as reported in Pratap and Quintin (2006), and in Turkey, as shown by Tansel and Khan (2012).

Many informal workers are single, tend to have less experience, and they are also less educated: around 40 per cent of formal wage-workers report university level qualifications, while 15 per cent of informal workers possess a degree, and around 36 per cent of informal workers report a basic secondary education. Both types of workers have similar levels of vocational education, albeit lower vocational education is more prevalent among informal workers. Furthermore, informality is more common among the rural respondents. Table 2 also demonstrates the geographic distribution of employment patterns, as living in the poor agricultural Southern region tends to raise the probability of informality. Managerial occupation has a negative impact on working informally. We observe that almost 5 per cent of formal workers are in microenterprises, compared to 30 per cent of informal workers. About 22 per cent of informal workers have less than 12 months job tenure in their current position, compared to only 12 per cent of formal workers. It can be argued that these employees are likely to enter the workforce for short-term earnings opportunities and that job separation rates are higher in the informal sector.

Formal contract does not determine workers' ability to access basic public goods (e.g. free health care) and therefore there is little incentive for them to seek a formal work arrangement. On the other hand, formal contract does enhance the quality of these services, as an individual could be eligible for higher pension payments and larger stipends on maternity leave. It can also be argued that workers have little incentive to push for the stronger implementation of a formal employment contract culture, since they could be satisfied with the non-monetary benefits of informal work.

***Table 2. Summary Statistics***

The OLS estimates of the earnings equations are set out in Table 3; we present the specification with seven industry and regional dummies in columns 3, 4, 6 and 7. An interesting finding is that the coefficient of the dummy for vocational education is not significant in the formal sector. The evidence that there is no significant difference between the earnings premium for those who have a degree substantiates Maloney's thesis that informal employment may be a voluntary choice: workers choose to work informally because it is equally attractive to work in

that sector, especially for degree holders. There is also a substantial premium for manages and those who dropped out of university in the informal sector. We find that both formal and informal workers in micro firms earn less than workers in small, medium and large firms. We observe that female employees experience an earnings penalty in the informal sector. Finally, there is evidence of a positive premium for married workers in the formal sector.

***Table 3. OLS Earnings Regressions***

Estimation results of the earnings equations using Heckman's procedure by including selection correction terms are set out in Table 4. We use the full set of control variables and find that there are no major differences with the corresponding OLS estimates. In both sectors, those with a degree earn more than the reference category and the coefficient for secondary education is only significant in the informal wage employment, to the tune of 0.179 log points. Following Halvorsen and Palmquist (1980), this translates into a 16.4 per cent increase in earnings to an individual who completed secondary education compared to those who obtained only basic secondary or primary education. The tenure-earnings profiles show that the low-tenured respondents experience a 16 per cent earnings loss in formal employment, and a 9 per cent loss in informal employment. Overall, we find that at similar education levels, except for university graduates, returns to education are higher in the informal sector.

***Table 4. Heckman Two-Step Earnings Regressions***

The decomposition results are presented in Table 5. Given the problem of dimensionality, which arises when we use many covariates for matching, we do not use the full set of characteristics. The unexplained earnings gap associated with differences in the returns that formal and informal workers receive to the observable characteristics contributes to nearly 100 per cent of the gap when we match using only experience. As we add more controls, the unexplained portion of the earnings gap falls to 7.2 per cent and the differences in workers' characteristics explain 14 per cent of the gap. Both terms are computed over the common support of the distributions of observable characteristics. However, the percentages of formal and informal workers who were matched fall with the inclusion of matching variables. The last column of Table 5 shows that only 36 per cent formal workers and 59 per cent of informal workers belong to the common support region. Around 9 per cent of the formal-informal

earnings differential can be explained by the differences between formal workers whose characteristics were unmatched with informal workers.

***Table 5. Decomposition of the Formal-Informal Earnings Differences***

The distributional analysis of the unexplained part of the gap is presented in Figure 4. We compute the unexplained gap along quintiles of the earnings distribution using the matching samples (see Nopo et al., 2010). That is, the raw wage gap at each quintile is computed as a percentage of the wage of the representative informal worker in the corresponding quintile. We find that adding matching variables reduces the unexplained gap along the earnings distribution and that the highest reductions are observed at the second and the third quintiles. Interestingly, as Figure 4 demonstrates, the unexplained gap becomes relatively homogenous along the earnings distribution after using firm size as a matching variable. Overall, the distributional analysis has demonstrated that the unexplained gap is lower at the bottom and top of the earnings distribution when we perform matching on the extended list of controls.

***Figure 4. Unexplained Formal-Informal Earnings Gap by Quintiles of the Distribution***

## 6. Conclusion

Interpreting empirical findings generates several points for discussion. First, analysis of individual characteristics reveals a generational component in informality in Kazakhstan. Second, the prevalence of informal employment arrangements is highest among agricultural workers. According to our findings, around a third of them are employed under an informal arrangement. Another interesting result is that low-educated workers and those who withdrew from university have higher returns to education in the informal sector. Furthermore, we also showed that it is useful to analyse not only the mean unexplained differences in earnings between formal and informal workers but also examine the unexplained gap along the wage distribution. Finally, we find that only half of the wage gap can be attributed to differences in individual characteristics.

While the individual may benefit from working in the informal sector, there are long-term consequences for the society as a whole: those who rely on informal jobs with low pay are prevented from improving their productivity. Thus, we suggest that authorities should use policy instruments that help workers who lack the necessary skills but seek to enter the formal

workforce in order to make gains. Furthermore, in an environment where excessive regulation exists, the reality may be that informal employment constitutes an equally attractive alternative to formal sector work. We suggest that economic policies aimed at the informal economy need to address the multidimensional nature of the challenge and therefore the authorities should design an appropriate policy mix. More broadly, we propose that reducing informal employment requires reforms so as to strengthen the institutional quality through such measures as targeting public expenditure on resources that enhance the productivity of the labour force.

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*Table 1. Employment, Contracts and Social Security by Gender and Locale, 2013*

Panel A. Employment levels (number of workers)

| | Total | Males | Females | Urban | Rural |
|---|---|---|---|---|---|
| Total Employed | 8,570,498 | 4,389,231 | 4,181,267 | 4,669,763 | 3,900,735 |
| Wage Workers | 5,949,608 | 3,015,868 | 2,933,740 | 3,827,720 | 2,121,888 |

Panel B. Share of wage workers in total employment (%)

| | Males | Females | Urban | Rural |
|---|---|---|---|---|
| | 68.7 | 70.2 | 82.0 | 54.4 |

Panel C. Contract arrangements of employees (%)

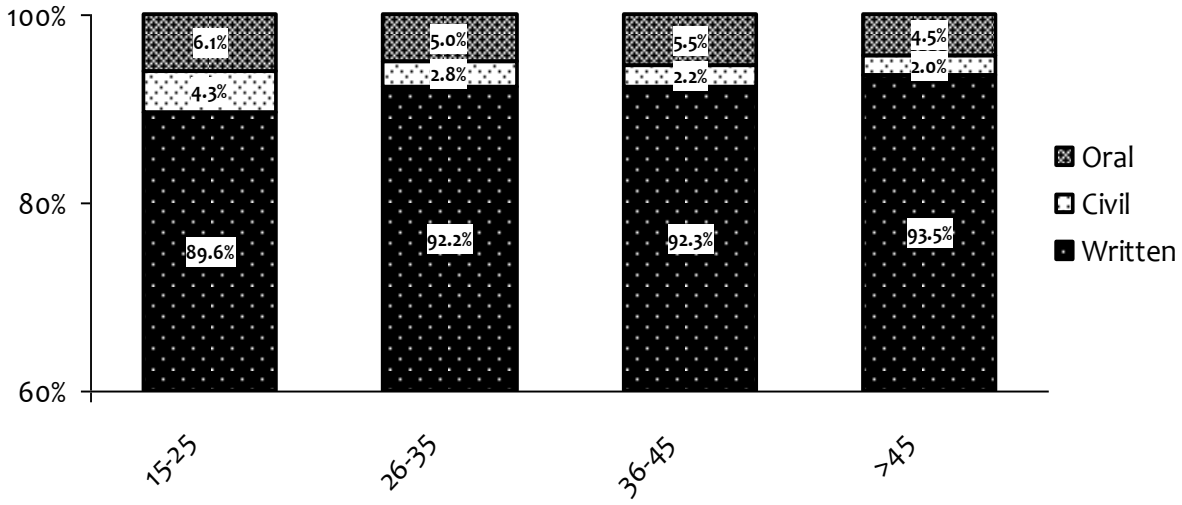
| | Males | Females | Urban | Rural |
|---|---|---|---|---|
| Written | 91.9 | 92.6 | 94.4 | 88.3 |
| Civil | 2.7 | 2.6 | 1.5 | 4.7 |
| Oral | 5.4 | 4.9 | 4.1 | 7.1 |

Panel D. Social benefits of employees with a written contract (%)

| | Males | Females | Urban | Rural |
|---|---|---|---|---|
| Pension | 90.7 | 91.9 | 93.5 | 87.4 |
| Vacation | 85.3 | 86.9 | 89.4 | 80.2 |
| Sickness | 81.9 | 84.1 | 85.5 | 78.4 |

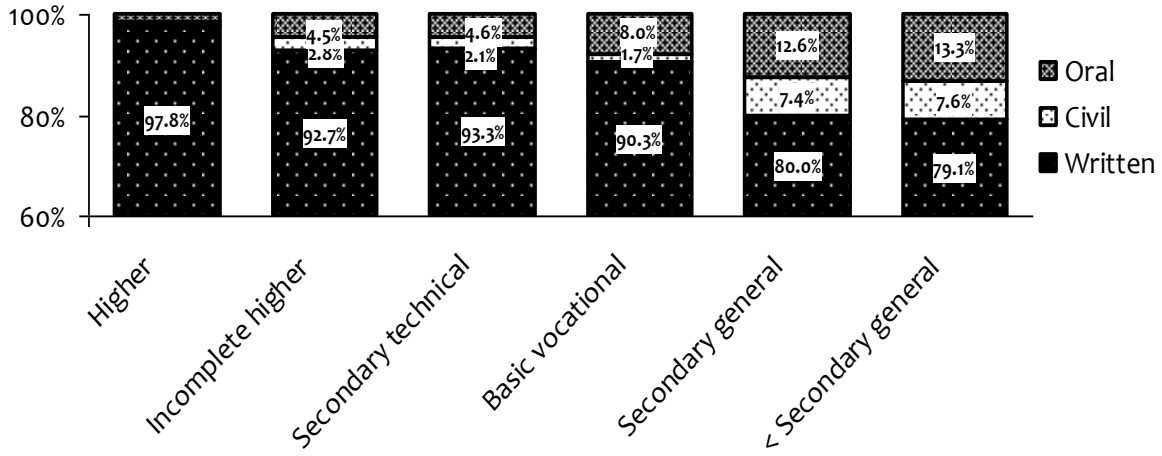
Source: 2013 KLFS; Authors' calculations.

Figure 1. Contract arrangements by age cohort, 2013



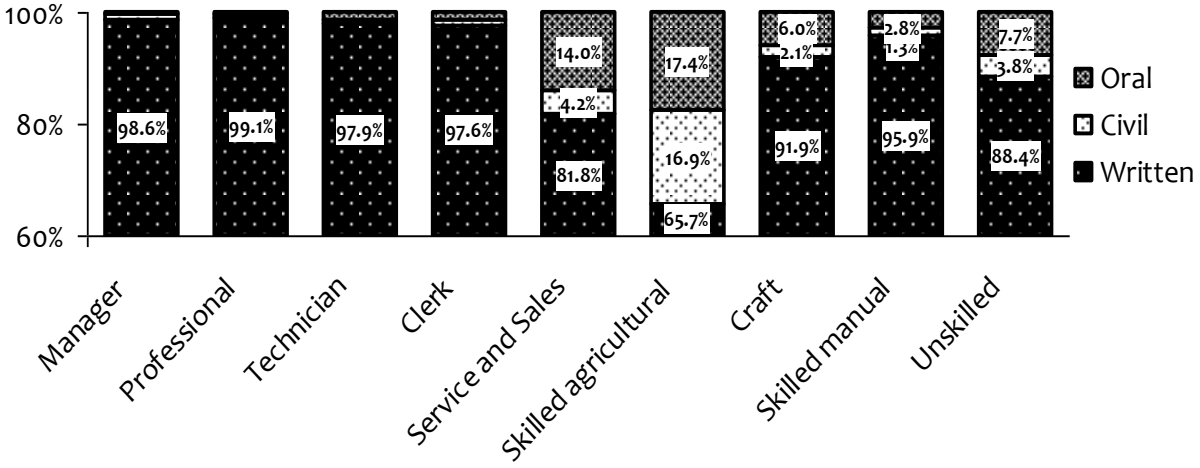

Source: 2013 KLFS; Authors' calculations.

Figure 2. Contract arrangements by education, 2013




Source: 2013 KLFS; Authors' calculations.

Figure 3. Contract arrangements by occupation, 2013




Source: 2013 KLFS; Authors' calculations.

*Table 2. Summary Statistics*

| | Formal | | Informal | | Pairwise Test | |
|---|---|---|---|---|---|---|
| log of wage | 5.816 | (0.484) | 5.498 | (0.565) | 0.318* | (-31.33) |
| exp | 20.19 | (11.30) | 19.61 | (11.49) | 0.577* | (-2.73) |
| $exp^2$ | 535.52 | (473.89) | 517.03 | (487.82) | 18.49* | (-2.07) |
| secondary | 0.142 | (0.349) | 0.361 | (0.480) | -0.218* | (-25.73) |
| vocational (lower) | 0.068 | (0.252) | 0.094 | (0.291) | -0.025* | (-4.89) |
| vocational (upper) | 0.353 | (0.478) | 0.361 | (0.480) | -0.008 | (-0.99) |
| university (incomplete) | 0.031 | (0.174) | 0.024 | (0.154) | 0.006* | (-2.39) |
| university (complete) | 0.400 | (0.490) | 0.145 | (0.352) | 0.255* | (-36.47 |
| female | 0.497 | (0.500) | 0.470 | (0.499) | 0.026* | (-2.84) |
| married | 0.690 | (0.463) | 0.607 | (0.488) | 0.082* | (-9.28) |
| widowed | 0.090 | (0.286) | 0.096 | (0.294) | -0.005 | (-1.06) |
| divorced | 0.039 | (0.194) | 0.038 | (0.192) | 0.001 | (-0.29) |
| manager | 0.067 | (0.250) | 0.021 | (0.143) | 0.046* | (-15.01) |
| tenure (≤ 1 year) | 0.120 | (0.325) | 0.219 | (0.414) | -0.099* | (-13.44) |
| micro (≤10 workers) | 0.049 | (0.215) | 0.304 | (0.460) | -0.256* | (-32.42) |
| rural | 0.319 | (0.466) | 0.444 | (0.497) | -0.125* | (-13.81) |
| agriculture&mining | 0.124 | (0.330) | 0.291 | (0.454) | -0.167* | (-20.83) |
| manufacturing&construction | 0.176 | (0.381) | 0.158 | (0.365) | 0.018* | (-2.71) |
| utilities | 0.049 | (0.217) | 0.012 | (0.109) | 0.037* | (-15.14) |
| transport&communications | 0.091 | (0.287) | 0.067 | (0.251) | 0.023* | (-4.91) |
| finance&estate | 0.037 | (0.189) | 0.019 | (0.138) | 0.017* | (-6.51) |
| government&administration | 0.108 | (0.311) | 0.026 | (0.159) | 0.082* | (-23.09 |
| education&health | 0.276 | (0.447) | 0.038 | (0.191) | 0.238* | (-50.81) |
| services | 0.076 | (0.265) | 0.135 | (0.342) | -0.058* | (-9.69) |
| akmola | 0.043 | (0.204) | 0.055 | (0.227) | -0.011* | (-2.72) |
| aktobe | 0.063 | (0.242) | 0.033 | (0.178) | 0.029* | (-8.45) |
| almaty (oblast) | 0.081 | (0.273) | 0.089 | (0.285) | -0.007 | (-1.53) |
| atyrau | 0.057 | (0.231) | 0.019 | (0.135) | 0.038* | (-13.32) |
| western | 0.039 | (0.194) | 0.028 | (0.164) | 0.011* | (-3.70) |
| dzhambul | 0.050 | (0.218) | 0.054 | (0.226) | -0.003 | (-0.92) |
| karaganda | 0.115 | (0.319) | 0.109 | (0.312) | 0.006 | (-1.06) |
| kostanay | 0.052 | (0.222) | 0.044 | (0.205) | 0.007* | (-2.02) |
| kyzyl-orda | 0.050 | (0.217) | 0.027 | (0.161) | 0.023* | (-7.26) |
| mangistau | 0.043 | (0.203) | 0.035 | (0.183) | 0.008* | (-2.47) |
| southern | 0.096 | (0.295) | 0.209 | (0.406) | -0.112* | (-15.62) |
| pavlodar | 0.057 | (0.232) | 0.052 | (0.223) | 0.004 | (-1.14) |
| northern | 0.025 | (0.157) | 0.027 | (0.162) | -0.001 | (-0.55) |
| eastern | 0.087 | (0.281) | 0.107 | (0.310) | -0.020* | (-3.67) |
| astana | 0.040 | (0.197) | 0.028 | (0.164) | 0.012* | (-4.12) |
| informality ratio | 0.027 | (0.103) | 0.623 | (0.302) | -0.596* | (-116.33) |
| *N* | 17092 | | 3558 | | | |

Notes: Standard deviations are in parenthesis. We compare the difference in the means of the formal and informal groups. The null hypothesis being that the difference between the means is zero. The t-statistics in the last column measure the ratio of the mean of the difference to the standard error of the difference. * for $p < 0.05$. Source: Authors' calculations using the 2013 KLFS/1st quarter data.

Table 3. *OLS Earnings Regressions*

| | Formal | | | Informal | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| exp | 0.004* | 0.005* | 0.004* | 0.013* | 0.012* | 0.008* |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.003) | (0.003) |
| $exp^2$ | -0.0001* | -0.0001* | -0.0001* | -0.0003* | -0.0002* | -0.0002* |
| | (0.0002) | (0.0002) | (0.0002) | (0.0001) | (0.0001) | (0.0001) |
| secondary | 0.093* | 0.090* | 0.060 | 0.159* | 0.180* | 0.181* |
| | (0.045) | (0.044) | (0.041) | (0.073) | (0.071) | (0.068) |
| vocational (lower) | 0.142* | 0.139* | 0.097* | 0.201* | 0.160* | 0.147* |
| | (0.046) | (0.045) | (0.042) | (0.077) | (0.075) | (0.071) |
| vocational (upper) | 0.296* | 0.298* | 0.223* | 0.385* | 0.323* | 0.256* |
| | (0.044) | (0.043) | (0.041) | (0.073) | (0.071) | (0.068) |
| university (incomplete) | 0.318* | 0.315* | 0.208* | 0.489* | 0.435* | 0.267* |
| | (0.048) | (0.047) | (0.044) | (0.092) | (0.089) | (0.085) |
| university (graduate) | 0.500* | 0.525* | 0.407* | 0.590* | 0.518* | 0.361* |
| | (0.044) | (0.044) | (0.041) | (0.076) | (0.074) | (0.071) |
| female | -0.154* | -0.110* | -0.112* | -0.116* | -0.132* | -0.123* |
| | (0.007) | (0.007) | (0.007) | (0.018) | (0.019) | (0.018) |
| married | 0.010 | 0.014 | 0.026* | 0.008 | 0.006 | -0.006 |
| | (0.011) | (0.010) | (0.010) | (0.026) | (0.025) | (0.024) |
| widowed | 0.046* | 0.041* | 0.041* | 0.015 | -0.023 | -0.022 |
| | (0.015) | (0.015) | (0.014) | (0.037) | (0.037) | (0.035) |
| divorced | 0.009 | 0.023 | 0.045* | 0.090+ | 0.069 | 0.065 |
| | (0.020) | (0.020) | (0.019) | (0.053) | (0.051) | (0.049) |
| manager | 0.132* | 0.111* | 0.132* | 0.323* | 0.296* | 0.266* |
| | (0.014) | (0.014) | (0.013) | (0.062) | (0.061) | (0.058) |
| tenure (≤ 1 year) | -0.211* | -0.208* | -0.170* | -0.059* | -0.073* | -0.095* |
| | (0.011) | (0.011) | (0.010) | (0.022) | (0.021) | (0.020) |
| micro (≤10 workers) | -0.144* | -0.163* | -0.092* | -0.202* | -0.172* | -0.119* |
| | (0.016) | (0.016) | (0.015) | (0.019) | (0.019) | (0.019) |
| constant | 5.537* | 5.506* | 5.855* | 5.196* | 5.268* | 5.743* |
| | (0.045) | (0.046) | (0.044) | (0.077) | (0.078) | (0.079) |
| Sector dummies | *No* | *Yes* | *Yes* | *No* | *Yes* | *Yes* |
| Region dummies | *No* | *No* | *Yes* | *No* | *No* | *Yes* |
| *N* | 17092 | 17092 | 17092 | 3558 | 3558 | 3558 |
| adj. $R^2$ | 0.161 | 0.184 | 0.294 | 0.141 | 0.189 | 0.275 |

Notes: Standard errors are in parenthesis. First stage (probit) results are available on request. + for $p < 0.10$ and * $p < 0.05$. Source: Authors' calculations using the 2013 KLFS/1st quarter data.

*Table 4. Heckman Two-Step Earnings Regressions*

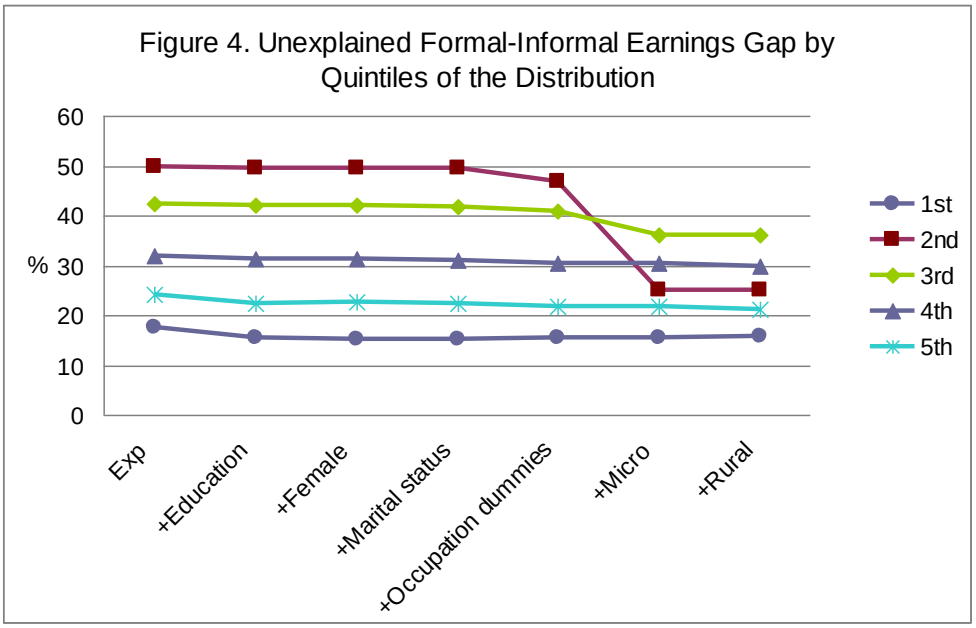
| | Formal | Informal |
|---|---|---|
| exp | 0.004* | 0.008* |
| | (0.001) | (0.003) |
| $exp^2$ | -0.00008* | -0.0001* |
| | (0.00002) | (0.00006) |
| secondary | 0.059 | 0.179* |
| | (0.041) | (0.067) |
| vocational (lower) | 0.095* | 0.145* |
| | (0.042) | (0.071) |
| vocational (upper) | 0.221* | 0.254* |
| | (0.041) | (0.067) |
| university (incomplete) | 0.205* | 0.266* |
| | (0.044) | (0.085) |
| university (graduate) | 0.404* | 0.360* |
| | (0.041) | (0.070) |
| female | -0.112* | -0.123* |
| | (0.007) | (0.018) |
| married | 0.026* | -0.005 |
| | (0.010) | (0.024) |
| widowed | 0.040* | -0.022 |
| | (0.014) | (0.035) |
| divorced | 0.045* | 0.065 |
| | (0.019) | (0.048) |
| manager | 0.132* | 0.267* |
| | (0.013) | (0.058) |
| tenure (≤ 1 year) | -0.170* | -0.095* |
| | (0.010) | (0.020) |
| micro (≤10 workers) | -0.089* | -0.121* |
| | (0.015) | (0.019) |
| constant | 5.861* | 5.747* |
| | (0.044) | (0.079) |
| lambda | -0.024+ | -0.014 |
| | (0.014) | (0.020) |
| Sector dummies | *Yes* | *Yes* |
| Region dummies | *Yes* | *Yes* |
| *N* | 17092 | 3558 |

Notes: Standard errors are in parenthesis. First stage (probit) results are available on request. + for $p < 0.10$ and * $p < 0.05$. Source: Authors' calculations using the 2013 KLFS/1st quarter data.

*Table 5. Formal-Informal Earnings Gaps Decompositions*

| | Exp | &Education | &Female | &Marital status | &Occupation dummies | &Micro | &Rural |
|---|---|---|---|---|---|---|---|
| $\Delta$ | 28.99% | 28.99% | 28.99% | 28.99% | 28.99% | 28.99% | 28.99% |
| $\Delta_0$ | 28.98% | 16.65% | 16.06% | 15.39% | 10.96% | 7.01% | 7.19% |
| $\Delta_X$ | 0.03% | 12.38% | 12.77% | 12.52% | 13.91% | 13.91% | 14.38% |
| $\Delta_F$ | 0.00% | -0.08% | 0.06% | 0.70% | 1.72% | 0.97% | -1.38% |
| $\Delta_I$ | -0.01% | 0.04% | 0.10% | 0.37% | 2.38% | 7.08% | 8.80% |
| % Formal in common support | 100% | 99.76% | 99.19% | 92.72% | 56.21% | 49.85% | 36.03% |
| % Informal in common support | 99.97% | 99.69% | 99.57% | 98.39% | 84.93% | 67.56% | 59.38% |
| s.e. | (0.032) | (0.033) | (0.033) | (0.033) | (0.037) | (0.044) | (0.051) |

Notes: Standard errors of the unexplained component of the gap in parenthesis. When the full set is used, only 5% of formal workers and 20% of informal workers lie on the common support of distributions of observable characteristics. Decomposition results based on matching with the full set of variables are available on request. Source: Authors' calculations using the 2013 KLFS/1st quarter data.




Source: Authors' calculations using the 2013 KLFS/1st quarter data.